Digital twins for health: a scoping review

Abstract

The use of digital twins (DTs) has proliferated across various fields and industries, with a recent surge in the healthcare sector. The concept of digital twin for health (DT4H) holds great promise to revolutionize the entire healthcare system, including management and delivery, disease treatment and prevention, and health well-being maintenance, ultimately improving human life. The rapid growth of big data and continuous advancement in data science (DS) and artificial intelligence (AI) have the potential to significantly expedite DT research and development by providing scientific expertise, essential data, and robust cybertechnology infrastructure. Although various DT initiatives have been underway in the industry, government, and military, DT4H is still in its early stages. This paper presents an overview of the current applications of DTs in healthcare, examines consortium research centers and their limitations, and surveys the current landscape of emerging research and development opportunities in healthcare. We envision the emergence of a collaborative global effort among stakeholders to enhance healthcare and improve the quality of life for millions of individuals worldwide through pioneering research and development in the realm of DT technology.